



# Taking the “Dense” out of Density

**Archived Information**

Rich Science Content with Really  
Inexpensive Stuff

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# Pencil Hydrometers

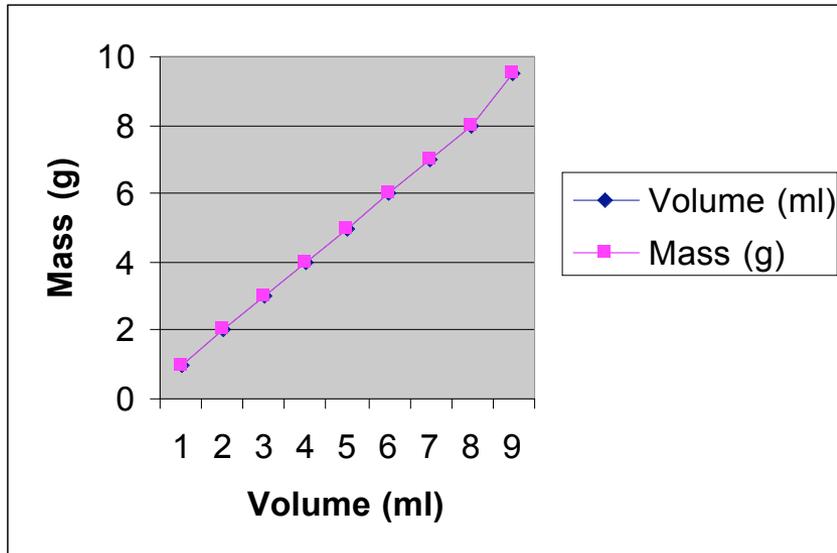
## ■ Density of solids

- Density is a factor of volume and mass.
- 43 people in a VW Bug is more dense than the same car with only 12.
- Density depends on how much matter is packed into how much space.

## ■ Making Pencil Hydrometers

- Good science involves accurate measurements and scale.
- Teach kids to measure carefully and accurately.
- These little things measure the density of liquids.

# Math connections



- Density of water
- If something sinks?
- If something floats?
- If something suspends?
  - $D = m/v$

# Lower Elementary



- Floaters and sinkers
- Which floats higher?
- Which floats lower?
- Similarities and differences
- Floating and sinking
- Dancing raisins
- Chart paper is my best friend

# Considerations



## ■ Variables in Science

- Kind of liquid
- Temperature
- Atmospheric pressure

## ■ Change one variable at a time

- Kind of liquid
- Hot vs. cold water

## ■ Does quantity of liquid matter?

- Intrinsic vs. extrinsic characteristics
- Testing for relationships
- Searching for patterns



# Density of Fruit

- **Density is mass divided by volume.**
- **Density can be used to identify a substance.**
- **Density can be used to sort substances.**

# Fruit density



|                           | <b>Apples</b>          | <b>Oranges</b>                      | <b>Bananas</b> | <b>Other</b> |
|---------------------------|------------------------|-------------------------------------|----------------|--------------|
| <b>Float or sink</b>      | <b>float</b>           | <b>float</b>                        | <b>sink</b>    |              |
| <b>Other observations</b> | <b>All kinds float</b> | <b>Sinks if you remove the skin</b> |                |              |



# Density of solids

- **Forensics**
- **Metal applications**
- **Cars and gas mileage**



# Density of Liquids

- **Manufacturing**
- **Wine and grape juice**
- **Sugar in iced tea**
- **Fat in milk**
- **Blood**



# Density and gasses

- Hot air balloons
- Birthday balloons
- Submarines
- Bread
- Carbonated soda
- Mac and cheese



# Unpacking The Standards

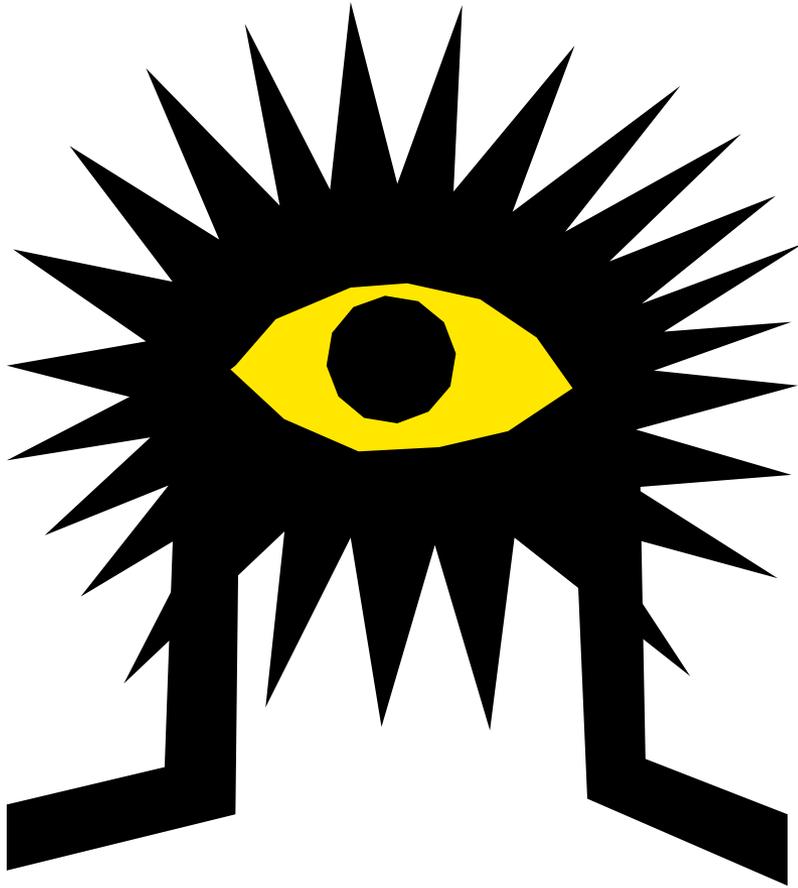
- **Properties of objects and materials**
  - Objects have observable properties.
  - Objects can exist in different states.
  - Characteristic properties of materials help identify them (5-8).
  
- **Position and motion of objects**
  - The position of an object can be described by its location relative to another object.



# Making the content sticky

- **How is floating related to density ?**
- **What is heavier than water?**
- **What differences are there between bananas and apples?**
- **How could you test your theory?**
  - What variables will you control?
- **Make a model.**
- **Connect the parts.**
- **Example...example...example!**
- **Assess them while the content is hot.**

# Proof is in the Pudding



- **Examining student work**
  - Why a 4 point scale?
  - Above the bar
  - Below the bar
- **Explaining 3 deep**
- **Models and analogies/metaphors**
- **Giving feedback**
  - Preserving your sanity
  - Student peer assessment
  - Parents as assessors



# The Path to Success for All

- **Identify the content clearly**
- **Find a great activity that illustrates the content**
- **Explore with the kids (lots of questions)**
- **Tighten up connections in examples**
- **Ask more questions**
- **Do not go too far...keep it tied to content level**
- **Let kids wrap it up**